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## Appendix 2

# Global Commodity Price Prospects

Crude oil prices increased about 3 percent in 2002 as a result of tight supplies and Middle East tensions. Non-oil prices increased about 5 percent, led by a 9 percent increase in agricultural commodities, which more than offset a 4 percent decline in metals and minerals (figure A2.1). Uncertainty about the strength of the global economic recovery contributed to the decline in metals and mineral prices, but the effect of uncertainty on agricultural prices was offset by lower supplies of selected commodities, such as grains and oilseeds, because of drought. The weakness in the U.S. dollar supported commodity prices.

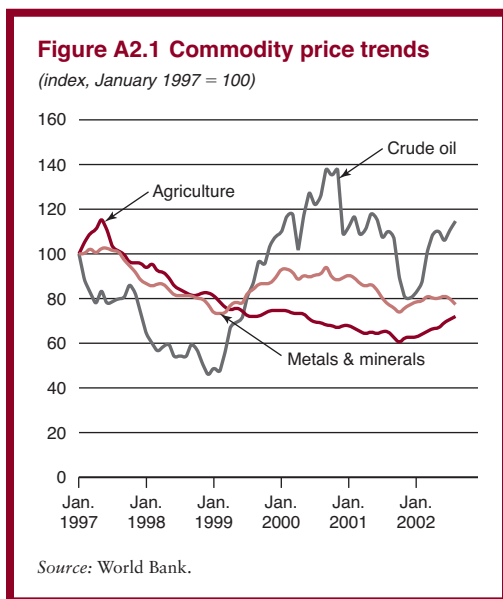
Crude oil prices are expected to remain firm in early 2003 because of the potential for military action against Iraq and tight supply conditions resulting from production restraint on the part of the Organization of Petroleum Exporting Countries (OPEC). Once Middle East tensions ease, oil prices are expected to decline because non-OPEC oil supplies will increase and Iraqi oil will return to the market. The average price of crude oil is projected to decline from \$25 per barrel in 2002 to \$23 per barrel in 2003. By 2005, crude oil prices are projected to decline to \$19 per barrel.

Non-oil prices are in the early stages of price recovery. That recovery is expected to last about three years before nominal prices will begin to weaken. The strength of the global economic recovery will strongly influence the timing and strength of the recovery in metals and mineral prices. However, the recovery of

agricultural prices will be more strongly influenced by supply increases and by recent weather disturbances such as El Niño and droughts. The index of nominal non-oil commodity prices is projected to increase by 5.8 percent in 2003 and by nearly 8 percent by 2005 in real terms. (Specific forecasts for commodity price and price indexes for 2002, 2003, 2005, 2010, and 2015 in current and constant dollars are given in tables A2.13–A2.15 later in this appendix.)

Agricultural commodity prices appear to have reached a cyclical low, after declining since mid-1997, and by 2005 nominal prices are expected to increase about 13 percent over 2002 levels. The increases will leave nominal prices of most agricultural commodities well below 1997 highs. Prices of specific agricultural commodities have declined much more than the average decline because of large supply increases, weak demand, or both. Some of those prices are not expected to recover to 1997 levels for the foreseeable future. Because of large supply increases from Vietnam and Brazil and because of slow growth in demand despite low prices, robusta coffee prices, for example, have fallen to nominal lows not seen since the 1960s. In 2002, cotton prices fell to nominal levels, which were last seen in 1986 and the mid-1970s. Palm oil prices declined by more than half from 1998 to 2002 and reached nominal levels last seen in 1986.

In real terms,<sup>1</sup> robusta coffee prices fell 85 percent from 1980 to 2001, and cotton



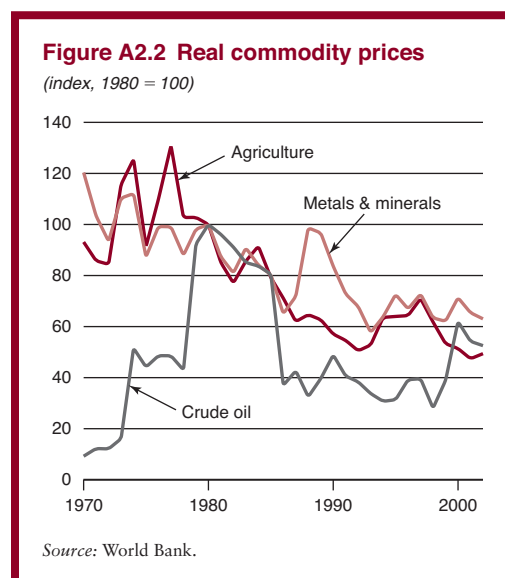
prices fell 61 percent from 1980 to 2002. Real palm oil prices declined 60 percent from 1980 to 2001. The extreme price declines in agricultural commodities resulted from a number of factors, including large increases in productivity, slow growth in demand caused by falling population growth rates and income elasticities, and policies that support production in high-income countries. Several large commodity exporters experienced depreciation of exchange rates. That depreciation, which was linked to Asia's economic crisis, further contributed to price declines.

Metals and mineral prices fell about 4 percent in 2002 as a result of weak demand, high stocks, and continued production increases. A recovery in prices following the October 2001 lows stalled in 2002 as the economic recovery slowed and as industrial demand failed to rebound as expected. Most metal markets were in surplus, and stocks remained high. A number of metal producers closed their production facilities in an attempt to prevent further stockbuilding and price declines. Despite such efforts, production increased in a number of countries. That increase, coupled with an absence of strong growth in demand, pressured prices lower. Nickel has been the one major

metal to sustain price increases that can be attributed to low stocks and expectations of tight supplies. Gold prices also rose strongly in 2002, mainly because of the buyback of producers' hedge positions. However, the decline in equity markets, weakening of the U.S. dollar, and nervousness about military activity in the Middle East also contributed to the price rise.

Crude oil prices began 2002 below \$20 per barrel because of weak demand, increasing supplies from non-OPEC producers, and over-quota production in several OPEC members. Nevertheless, OPEC production restraint has been sufficient to bring prices back to the top of OPEC's targeted range of \$22 to \$28 per barrel. Significant OPEC cutbacks, which commenced in early 2001, started to draw down crude oil stocks during the second half of 2002 and generally supported higher prices. In addition, increasing uncertainty about a supply disruption from a possible U.S. attack on Iraq helped push prices higher—to near \$30 per barrel.

Real commodity prices declined significantly from 1980 to 2001, with the World Bank's index of agricultural prices down 53 percent, crude oil prices down 46 percent, and metals and mineral prices down 35 percent (figure A2.2). Such declines in commodity



prices, relative to manufactures prices, pose real challenges for developing countries that depend on primary commodities for a substantial share of their export revenues. The declines are expected to continue in the longer term as productivity increases in commodities continue to outpace those in manufactures.

## Agriculture

**A**gricultural commodity prices are expected to increase about 9 percent in 2002 after falling 9 percent in 2001. The increase follows sharp declines from 1997 to 2001 that reduced the World Bank's index of annual agricultural prices by 38 percent. Prices are expected to increase 13 percent from 2002 to 2005 in nominal terms. That increase will recover a little more than one-third of the 1997–2001 decline. The recovery of prices is expected to be modest because of weak growth in demand, continued rapid increases in production and productivity, and high stocks in some com-

modities, such as coffee, cotton, and sugar. Real prices will rise an estimated 11 percent from 2002 to 2015. However, the rise in real prices is a reflection of current low prices rather than a change in the long-term trend of declining prices relative to manufactures.

There has been considerable disparity among commodities: prices of some commodities (cocoa) reached multiyear highs in 2002, while others (coffee and cotton) have recently reached new lows or continue to decline. The disparity is related partly to the different levels of carryover stocks, and partly to the effects of weather conditions on supply. Droughts in Australia, Canada, and the United States reduced yields and contributed to increases in grain and oilseed prices.

The United States enacted a new farm bill, which will be in effect from 2002 to 2007. The bill raised price supports for many commodities and included some commodities that had not previously been included under government programs (see box A2.1). The European

## Box A2.1 U.S. Farm Bill

**O**n May 13, 2002, the United States enacted a new farm bill, the Farm Security and Rural Investment Act of 2002. The new bill covers a six-year period, from 2002 to 2007. Low commodity prices had led to a series of annual bailouts to supplement regular subsidy programs under the previous law. The new farm bill essentially extends those temporary bailouts through the six-year life of the bill.

The key features of the new farm bill are higher price supports for major crops, the revival of target prices to give more subsidies to producers when world prices fall, and a large increase in conservation programs. The bill continues fixed annual payments to grain and cotton farmers. It creates a new target price system similar to the one abolished in 1996, to provide supplemental payments when prices fall below certain levels—except that acreage set-asides are no longer necessary for farmers to qualify for payments under the new bill. It allows farmers to update planting records that are used in calculating certain program payments. The bill also establishes

new subsidies for dairy farmers as well as for producers of lentils, chickpeas, peanuts, honey, wool, and mohair. It expands the Conservation Reserve Program, which pays farmers to let environmentally sensitive land stand idle, and it establishes a new Conservation Security Program to pay crop farmers for improved environmental practices.

Under the 1994 Uruguay Round Agreement on Agriculture, the United States agreed to limit spending on domestic agricultural support programs, which are considered trade distorting, to \$19.1 billion per year. Since payments are not fixed, but are determined by the levels of market prices as well as the levels of support, it is not possible to know whether payments under the new farm bill will exceed the agreed limit. If it appears that this limit will be met or exceeded, the U.S. Congress has instructed the U.S. Department of Agriculture (USDA) to take steps to reduce payments so as not to exceed this limit.

*Source:* Bank staff.

## Box A2.2 E.U. Common Agricultural Policy

President Chirac of France and Chancellor Schroeder of Germany reached a budget agreement on the Common Agriculture Policy (CAP) in Brussels October 26–27, 2002. The agreement limits CAP budgets to increases of 1 percent annually from 2006 to 2013 from an estimated budget of 45.6 billion euros in 2006. Total direct and indirect support to E.U. agriculture was estimated at 117.9 billion euros in 2001 by the OECD; more than half of that support comes from higher food prices paid by consumers.

Participants in the Brussels summit proposed that agricultural support to new E.U. accession countries increase from 25 percent of current member-support levels when those countries join in 2004 to 40 percent in 2007 and parity by 2013. The agreement puts a limit on CAP spending increases even after the 10 accession countries join in 2004, a limit that could necessitate CAP reforms as the accession countries' support levels increase or that could require shifting of funds from farmers in current member countries.

E.U. Agriculture Commissioner Franz Fischler had proposed radical CAP reforms in July 2002 in the Midterm Review of Agenda 2000. The reforms would shift income support away from production of surpluses and toward meeting of tough environmental, animal welfare, and food safety standards. According to the proposal, E.U. farmers would get a single decoupled payment based on historical references—regardless of whether they continue production on the same scale. Direct spending on farmers would be cut by 3 percent per year over seven years, and the savings would be spent on rural development. Aid to large farms would be capped. This proposal has proved controversial, and several European states have indicated their opposition to changing the current system.

*Sources:* Agra Europe Ltd., London and European Commission. Information about the Common Agricultural Policy can be found on the European Union Web site: [http://europa.eu.int/pol/agr/index\\_en.htm](http://europa.eu.int/pol/agr/index_en.htm).

Union reached an agreement that limits future budget increases for the Common Agricultural Policy through 2013 (see box A2.2).

### *Beverages*

The World Bank's index of beverage prices (comprising coffee, cocoa, and tea prices) increased about 17 percent in 2002, largely because of a 70 percent increase in cocoa prices. In contrast, coffee and tea prices remained weak. The sharp increase in cocoa prices reflects production problems and the recent coup attempt in Côte d'Ivoire, a major producer of cocoa. The weakness in coffee prices can be attributed to large stocks, weak demand, and large production increases by major exporters. Tea prices declined as a result of abundant supplies and weak growth in demand.

*Coffee.* Coffee prices fell to record lows and became the most visible symbol of the declines in agricultural commodity prices during 2002.

In real terms, coffee prices are currently less than one-third of their 1960 level. The decline reflects mostly the surge in supplies, but the equally important longer-term problem is weak demand. According to the U.S. Department of Agriculture (USDA), per capita annual coffee consumption in the major importing countries has been stagnant, at about 4.5 kilograms of green coffee equivalent, during the past decade.

Global coffee production in the 2002–03 season is expected to increase 10.7 percent from last season's 110.7 million bags (table A2.1). Brazil, the dominant producer with one-third of global output, is expected to produce a record 46.9 million bags, while Colombia and Vietnam, the second and third largest producers, will each reach about 10 million bags.

A number of unsuccessful attempts have been made to arrest the price decline. The Association of Coffee Producing Countries, which has urged coffee producers to join its

**Table A2.1 Coffee production in selected countries***(million bags)*

	1997–98	1998–99	1999–2000	2000–01	2001–02	2002–03
Brazil	22.8	35.6	30.8	34.1	33.7	46.9
Colombia	12.2	10.9	9.5	10.5	11.0	10.9
Côte d'Ivoire	3.7	2.2	5.7	4.3	3.3	3.3
Indonesia	7.8	6.9	6.7	6.5	6.0	5.8
Mexico	5.1	5.0	6.2	4.8	4.7	5.2
Vietnam	6.9	7.5	11.0	15.3	12.3	10.5
World	96.4	108.4	113.3	117.0	110.7	122.6

*Source:* U.S. Department of Agriculture.

export retention scheme for the past three seasons, ceased operating on February 1, 2002. A plan backed by the International Coffee Organization, which called for removal of low-quality coffee beans from the market, was not well supported by some coffee-producing countries because it did not compensate producers of low-quality beans. A number of countries have also undertaken their own price-support schemes or stock-holding mechanisms. Brazil, for example, has subsidized put options to effectively guarantee a minimum price to producers. While such schemes may be partially successful in the short run, they could exacerbate the oversupply problem in the long run.

We project a recovery in both robusta and arabica prices in 2003 and a further recovery in arabica in 2004. Nevertheless, we recognize the risk that it may take longer for the recovery to materialize if the recent supply surge persists. Over the long term, real coffee prices are expected to recover, but they will remain well below the historical highs of the 1970s and more recent highs of the 1990s. By 2015, real arabica and robusta prices are projected to increase about 75 percent from the 2002 levels. Prices would still be about only half of their 1990s peaks.

**Cocoa.** Cocoa prices led the recovery of agricultural commodity prices, after falling to a three-decade low in February 2000. Since then, cocoa prices have more than doubled to a 16-year high amid supply disruption in major producers from political instability and from producers' responses to extremely low prices.

Production in two major producers, Côte d'Ivoire and Ghana, is estimated to be down 4 percent and 2 percent, respectively, in the just-ending 2001–02 marketing season. The extreme price increases in response to such relatively small changes in output were partly caused by speculative buying by commodity funds. In addition, uncertainty about the reliability of supplies prompted strong demand from processors.

Cocoa prices are expected to remain at their 2002 level next year. They will decline 12 percent in 2004 as production continues to increase. This forecast is based on the assumptions that (a) the strong prices enjoyed this season have already given incentives to growers to maintain their trees and to increase production; (b) part of the recent surge in prices may have been caused by speculative activities of a short-term nature that are unlikely to be carried over into the next year; and (c) the recent coup attempt in Côte d'Ivoire has been repelled.

In response to high prices, growth in demand for cocoa in the current and next marketing season is expected to slow from the 1990–2000 average of 2.4 percent. But it should then return to historical growth rates (table A2.2). By 2015, real prices are projected to decline 25 percent from 2002 levels.

**Tea.** The three-auction average tea price fell 6 percent in 2002 as supplies continued to increase relative to demand and stocks remained high (table A2.2). Production in major exporters (India, Kenya, and Sri Lanka) was up

**Table A2.2 Global balance for beverages**

	1970	1980	1990	1999	2000	2001	Annual growth rate (%)		
							1970-80	1980-90	1990-00
<b>Coffee (thousand bags)</b>									
Production	64,161	86,174	88,849	113,345	117,049	110,773	2.11	1.36	1.20
Consumption	71,536	79,100	96,300	104,670	106,580	108,450	1.01	1.97	0.22
Exports	54,186	60,996	76,163	92,256	89,968	88,788	0.78	2.41	1.68
<b>Cocoa (thousand tons)</b>									
Production	1,554	1,695	2,506	3,073	2,812	2,750	0.46	4.62	1.16
Grindings	1,418	1,556	2,335	2,967	3,014	2,823	0.16	4.48	2.58
Stocks	497	675	1,791	1,341	1,111	1,101	2.38	13.89	-4.66
<b>Tea (thousand tons)</b>									
Production	1,286	1,848	2,516	2,900	2,960	3,030	4.09	2.87	1.49
Exports	752	859	1,132	1,259	1,330	1,389	2.35	2.39	1.62

Notes: Time reference for coffee (production and exports) and cocoa are based on crop year shown under the year that production begins: October to September for cocoa and April to March for coffee. Coffee consumption and tea data are based on the calendar year.

Sources: International Coffee Organization (ICO), International Cocoa Organization (ICCO), Food and Agriculture Organization (FAO) of the United Nations, International Tea Committee (ITC), U.S. Department of Agriculture, and World Bank.

4 percent in 2001—the last year for which data are available. Other exporters, such as China and Vietnam, have also been increasing exports rapidly, and such increases could further weaken prices.

Prices are projected to increase modestly from the 2002 lows (up 3 percent in 2003), but they will remain depressed relative to the highs in 1997 and 1998. If emerging exporters, such as Vietnam, continue to increase exports, there is a significant risk that prices could continue to fall. However, higher petroleum export prices in the Russian Federation and in major consuming countries in the Middle East have historically supported demand, and we expect tea prices to begin a gradual recovery. By 2005, we project nominal tea prices to rise 10 percent from 2002 levels, which would leave nominal prices down 20 percent from 1997 levels.

### Food

The index of food prices has not changed for several years after declining sharply during 1997-99 (figure A2.3). The index rose about 4 percent in 2002 and is expected to rise 7 percent in 2003 and 2 percent in 2004 because of higher grain and oilseed prices following this year's drought in major grain- and soybean-

**Figure A2.3 Food prices**

(index, 1990 = 100)



Source: World Bank.

exporting countries. By 2015, real prices should decline about 2 percent from 2002 levels.

**Fats and oils.** Prices of fats and oils recovered 13 percent in 2002 after falling 40 percent from 1997 to 2001. The increase was greatest in vegetable oils such as palm oil (up 35 percent) and coconut oil (up 30 percent)



because of lower production. Meal prices remained weak, with soymeal down 3 percent because of weak demand for livestock and poultry feeds. Prices of most fats and oils are expected to increase during 2003–05, and the index of prices is expected to increase 13 percent in nominal terms from 2002 to 2005.

Global production of the major fats and oils is expected to increase about 2 percent in 2002–03, while consumption is expected to increase by 3.2 percent, causing stocks to decline and prices to continue increasing. Palm and soybean oil production is the largest among the vegetable oils. Together they represent 40 percent of total vegetable oil production. World soybean production is expected to remain constant in 2002 because of drought in the United States, after growing by 5.3 percent per year since 1990. This stoppage in growth has led to higher soybean prices and reduced stocks in 2002 and is expected to support higher prices in 2003. Other major producers (table A2.3) are expected to increase soybean production despite economic problems and uncertainties.

Palm oil production has more than doubled since 1990 (table A2.4), with the largest increases coming from Indonesia and Malaysia. However, production is expected to increase a more modest 2 percent in 2002–03.

**Grains.** World grain stocks, relative to use, are expected to fall significantly during the current crop year (table A2.5), and the declines are expected to keep grain prices rising through 2003. Prices should then decline as production

**Table A2.3 Soybean production**  
(million tons)

Year	Argentina	Brazil	United States	World
1990	11.5	15.8	52.4	104.1
1995	12.4	24.2	59.2	124.9
2000	27.8	39.0	75.1	175.1
2001	29.5	43.5	78.7	183.7
2002	30.0	48.0	71.5	183.3

Note: Argentina, Brazil, and the United States account for about 80 percent of global production.  
Source: U.S. Department of Agriculture.

**Table A2.4 Palm oil production**

(million tons)

Year	Indonesia	Malaysia	World
1990–91	2.41	6.10	11.03
1995–96	4.22	7.81	15.22
2000–01	7.53	11.94	23.54
2001–02	8.20	11.65	23.98
2002–03	8.50	11.82	24.53

Source: Oil World.

**Table A2.5 Global grain stocks-to-use**

(percentages, excluding China)

Year	Maize	Rice	Wheat	Total grains
1997–98	10.1	8.8	17.0	13.1
1998–99	11.5	9.6	18.6	14.0
1999–2000	11.4	11.5	17.7	13.7
2000–01	11.5	12.9	19.0	14.3
2001–02	10.1	13.7	21.1	15.1
2002–03	6.0	10.9	19.9	12.7
1990s low	6.0	7.8	13.9	9.7

Source: U.S. Department of Agriculture.

increases in response to price increases. There is a risk that grain prices could continue to rise even more sharply than projected if the drought continues in the major exporting countries, or if other major grain producers have lower-than-expected production. Wheat prices are projected to rise an additional 19 percent in nominal terms by 2003 after increasing nearly 20 percent in 2002. Prices are then expected to decline 6 and 12 percent in 2004 and 2005, respectively, as production responds to the higher prices. Maize prices rose 12 percent in 2002 and are expected to rise an additional 25 percent by 2003 before declining in 2004 and 2005. Rice prices rose 11 percent in 2002 and are expected to rise an additional 22 percent by 2005.

Stocks in the major grain exporting countries—the United States, the European Union, Canada, Australia, and Argentina—are expected to fall to the lowest level in 2003–03, relative to total use, since 1997–98. The decline is mostly attributable to the droughts in the United States, Canada, and Australia, which are expected to reduce grain yields by 9,

7, and, 6 percent, respectively, in 2002–03 compared with yields in the previous year. An El Niño weather pattern has contributed to the unfavorable weather pattern in Australia and could further reduce production next year.<sup>2</sup> The lower yields in the United States, Canada, and Australia have been partially offset by record grain yields and production in the European Union. Economic problems in Argentina have contributed to lower production and exports from that country, but the largest effect of the economic turmoil is expected to be in the next crop year, because most of the planting and input-use decisions had already been made before the economic crisis fully emerged.

Grain production in developing countries is projected to be down 1.8 percent in 2002–03, with production generally strong in Asia, Latin America, and the Middle East, but lower in Eastern Europe and Russia. Production in China is expected to be up 2.3 percent, while production in India is expected to be down 4.9 percent because of a poor monsoon season.

There is considerable variation in the stock situation in individual grains, with the global stocks-to-use percentage for maize at the lowest levels of the 1990s, while rice and wheat percentages are above previous lows. However, grain prices are highly correlated, and price increases in one grain would normally be reflected in the prices of others. Higher grain prices would benefit developing-country net exporters such as Argentina (which is expected to export more than 22 million tons of grain in 2002–03) while harming net importers such as Mexico and the Arab Republic of Egypt, which are expected to import 13 million and 10 million tons of grain, respectively, in 2002–03.

**Sugar.** Sugar prices fell to 15 cents per kilogram in 2002 (down 21 percent from 2001) to return to the lower end of the trading range of 10–30 cents per kilogram of the past 20 years. The decline follows an estimated 5 percent increase in world sugar production in the mar-

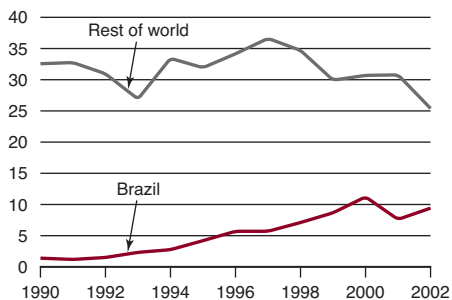
keting year that just ended in August, and an increase in carryover stocks to nearly 50 percent of annual consumption. Brazil, the largest exporter, is expected to have a sugar cane crop that could exceed the previous year's crop by 8 or 9 percent. Imports are expected to be weak because of large production in importing countries. Hence, prices are unlikely to recover significantly in 2003.

Brazil has nearly 30 percent of the export share in recent years and has been the primary source of increased global exports, with production and exports growing rapidly in the past decade (figure A2.4). The other major exporters, Australia and Thailand, increased production by 50 and 70 percent, respectively, from 1990–91 to 1997–98, when sugar prices were attractive. However, they have cut production as prices have declined.

Sugar prices are expected to begin to recover in 2004 as low prices reduce global supplies. However, prices are expected to remain relatively weak for the next several years, with fluctuations depending on the year-to-year balance of production and consumption. By 2005, nominal sugar prices are expected to increase 17 percent over 2002 levels. In the long term, nominal prices are expected to return to the center of the trading range, and real prices are expected to average about 18 cents per kilogram (8.2 cents per pound).

**Figure A2.4 Sugar exports**

(million tons, raw equivalent)



Source: U.S. Department of Agriculture.



**Table A2.6 Global balance for foods**

	1970	1980	1990	1999	2000	2001	Annual growth rates (%)		
							1970–80	1980–90	1990–2000
<b>Grains (million tons)</b>									
Production	1,079	1,430	1,769	1,871	1,839	1,860	2.88	1.55	1.04
Consumption	1,114	1,451	1,717	1,869	1,868	1,890	2.58	1.78	1.02
Exports	119	212	206	245	233	231	6.35	0.13	0.94
Stocks	193	309	490	529	500	470	7.24	3.83	-0.56
<b>Soybean (thousand tons)</b>									
Production	42,133	62,173	104,093	159,904	175,098	183,724	6.84	1.87	5.08
Consumption	45,968	68,052	104,307	160,541	172,166	184,228	6.53	2.04	4.99
Exports	12,342	20,822	25,388	46,683	55,074	57,127	5.24	0.80	2.88
Stocks	3,394	10,266	20,569	27,908	30,803	30,218	13.83	-0.66	0.20
<b>Sugar (thousand tons [raw equivalent])</b>									
Production	70,919	84,742	109,403	138,094	143,220	136,111	2.80	1.59	3.26
Consumption	65,395	91,062	106,807	130,281	133,104	134,712	3.30	1.40	3.00
Exports	21,931	27,571	34,078	38,710	42,015	38,495	3.26	0.83	3.12
Stocks	19,614	19,494	19,299	31,702	35,939	35,474	3.96	-0.77	4.52
<b>Fats and oils (million tons)</b>									
Production	39.78	58.09	80.84	113.42	117.09	119.42	3.68	3.54	3.70
Consumption	39.82	56.80	80.87	111.98	116.94	120.74	3.55	3.69	3.64
Exports	8.83	17.76	26.89	35.55	38.10	39.57	7.05	4.19	3.39
Stocks	5.18	9.25	12.15	14.26	14.47	13.19	7.09	2.44	0.69

Note: Time references for grains, soybeans, and sugar are based on marketing years, shown under the year in which production begins, and they vary by country. For fats and oils, crop years begin in September.

Source: U.S. Department of Agriculture and Oil World.

The global balances for major foods are given in table A2.6. The balances show that the rate of growth of production and consumption of grains has slowed during the 1990s compared with previous decades, while growth rates have increased for soybeans and sugar. The growth rates for fats and oils were relatively constant during the 1980s and 1990s.

### *Agricultural raw materials*

The index of agricultural raw materials prices (comprising prices of tropical hardwoods, cotton, and natural rubber) declined sharply during Asia's economic crisis and then stabilized before declining again as supplies of commodities continued to increase (figure A2.5). Prices reached a low in 2001 and have since recovered because of higher cotton and natural rubber prices. Nominal prices are projected to increase 16 percent by 2005 from

2002 levels, while real prices are projected to rise 18 percent by 2015 over 2002 levels.

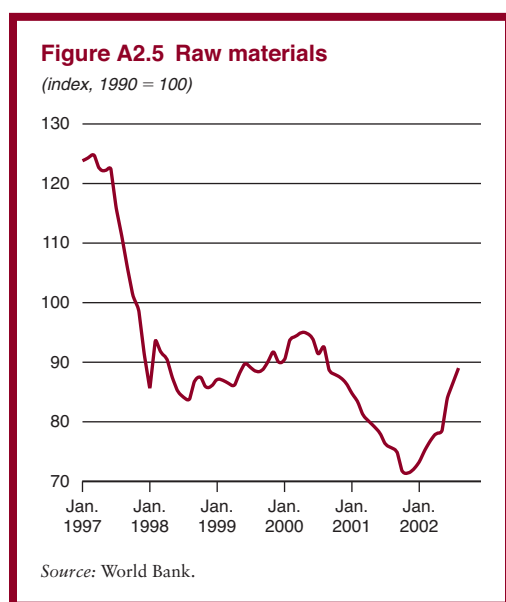
**Cotton.** Cotton prices declined an additional 5 percent in 2002 after declining 19 percent in 2001 because of large production increases in the United States and China, the two largest producers (table A2.7). Prices in 2002 were less than half of their 1995 highs, and they reached 30-year nominal lows. The extreme price weakness was caused by a number of factors, such as slow growth in demand, large production, and competition from synthetic fibers. Subsidies to cotton producers in the United States and China have contributed to the production surplus. During the past three seasons, U.S. support to its cotton producers averaged almost \$3 billion, and China's support averaged \$2 billion.

Cotton production in the coming season is expected to be 19.2 million tons—10 percent

**Table A2.7 Cotton production in selected countries***(thousand tons)*

Country	1998–99	1999–2000	2000–01	2001–02	2002–03
China	4,501	3,830	4,350	5,320	4,420
Franc zone	897	928	700	1,034	921
India	2,710	2,650	2,350	2,686	2,500
Pakistan	1,480	1,800	1,750	1,853	1,731
United States	3,030	3,835	3,818	4,420	3,826
Uzbekistan	1,000	1,150	960	1,055	1,015
World	18,551	18,887	19,126	21,422	19,157

Source: International Cotton Advisory Committee.



lower than in the previous season, with the United States and China accounting for most of the decline. In the United States, the drought has reduced production from the record 2001–02 season. Global consumption is expected to increase about 2.6 percent, according to the latest forecasts by the International Cotton Advisory Committee. Given lower production in combination with higher consumption, we forecast the A Index cotton price to increase 10 percent in 2003 and 16 percent in 2004. By 2015, real prices are projected to increase 30 percent relative to 2002 prices.

**Natural rubber.** After prolonged weakness following the Asian crisis, natural rubber

prices gained momentum at the beginning of 2002, with average 2002 prices rising about 32 percent from 2001. The recovery is mainly a response to adverse weather conditions in Thailand and a slowdown in Malaysia's output growth as natural rubber plantations are being converted to more profitable palm oil plantations. Demand, however, remains weak as car tire manufacturing (the largest demand for natural rubber) in Organisation for Economic Co-operation and Development (OECD) countries is estimated to be down 2 percent in 2002.

The strength in natural rubber prices is likely to persist because supply controls by the Tripartite Rubber Corporation—a trilateral organization formed last year by Indonesia, Malaysia, and Thailand following the collapse of the International Natural Rubber Organization—may restrict exports. We expected natural rubber prices to remain firm, but not increase significantly, in 2003 from 2002 levels because of weak demand that accompanies the apparent slowing of growth in the global economy. By 2005, nominal prices are expected to increase 6 percent from 2002 levels. Over the longer term, real prices are projected to decline—down 3 percent from 2002 to 2015.

**Tropical timber.** The decline in Asian tropical timber prices since the mid-1990s appears to have ended, and prices have begun to recover from the lows reached at the end of 2001. Nominal timber prices increased about 9 percent in 2002 compared with 2001 prices

as a result of the improved demand from Japan, the weakening of the U.S. dollar relative to the yen, and the continued strong import demand from China. Prices are expected to continue to recover in 2003 and 2004, with annual average increases of 8 percent per year, resulting from improved economic growth in Asia. African sapelli log prices have declined less than Asian log prices, as demand has remained firm in Europe. Sapelli nominal log prices are expected to increase about 5 percent from 2002 to 2005.

Real tropical timber prices are expected to recover from lows, but they are not expected to reach new highs during the forecast period to 2015. By 2015, real meranti log prices are projected to rise 47 percent, while sapelli log prices are projected to rise by only 18 percent. The difference is due to the smaller decrease and, therefore, smaller rebound of African sapelli logs prices compared with Asian meranti log prices.

The global balances for raw materials are given in table A2.8. The data show that cotton production, consumption, and exports

slowed dramatically during the 1990s compared with the 1980s. Exports of cotton grew only 0.2 percent during the 1990s, which contributed to the sharp price decline. Growth rates of natural rubber production, consumption, and exports remained nearly constant during the 1990s compared with the 1980s. Tropical timber log production slowed while production of sawnwood increased as timber-producing countries shifted to increased domestic processing. Sawnwood imports increased while plywood imports slowed during the 1990s compared with the 1980s.

## Fertilizers

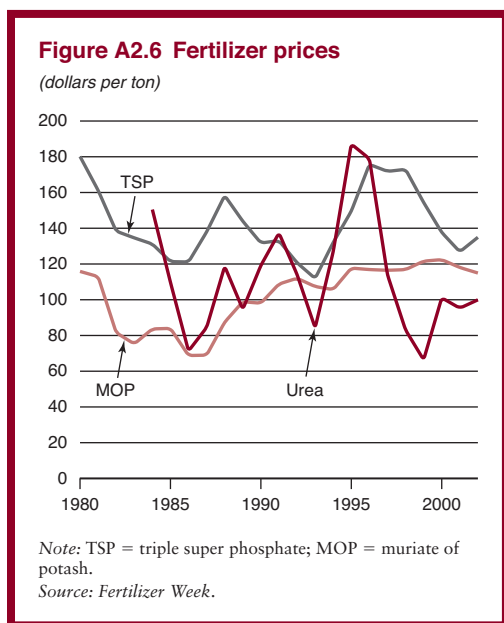
Fertilizer prices remained nearly constant in 2002 after several years of large adjustments (figure A2.6). Import demand remained weak because of low commodity prices and increased local production. However, fertilizer production in major exporters contracted in response to low fertilizer prices. Hence, a market balance was achieved with little pressure on prices. Acreage used for global grain

**Table A2.8 Global balance for raw materials**

	1970	1980	1990	1999	2000	2001	Annual growth rates (%)		
							1970–80	1980–90	1990–2000
<b>Cotton (thousand tons)</b>									
Production	11,740	13,832	18,970	19,126	19,408	21,422	1.2	3.1	0.8
Consumption	12,173	14,215	18,576	19,796	19,762	20,070	1.1	3.1	0.2
Exports	3,875	4,414	5,081	6,142	5,750	6,430	0.9	2.8	0.5
Stocks	4,605	4,895	6,645	9,559	9,274	10,630	1.7	2.8	1.4
<b>Natural rubber (thousand tons)</b>									
Production	3,140	3,820	5,080	6,810	6,740	7,170	1.8	3.2	3.1
Consumption	3,090	3,770	5,190	6,660	7,330	7,030	1.6	3.2	3.3
Net exports	2,820	3,280	3,950	4,670	4,940	5,160	1.3	2.1	1.8
Stocks	1,480	1,480	1,500	2,540	1,950	2,090	0.6	0.2	3.7
<b>Tropical timber (thousand cubic meters)</b>									
Logs, production	210	262	300	286	287	276	1.5	1.7	0.5
Logs, imports	36.1	42.2	25.1	18.3	21.1	21.0	0.2	5.1	5.4
Sawnwood, production	98.5	115.8	131.8	103.9	101.5	99.3	1.2	1.7	2.0
Sawnwood, imports	7.1	13.2	16.1	21.2	24.3	23.5	5.0	2.6	3.3
Plywood, production	33.4	39.4	48.2	52.6	55.4	54.9	1.2	2.0	0.5
Plywood, imports	4.9	6.0	14.9	18.9	19.8	20.3	0.7	9.1	3.6

Notes: Time reference for cotton is based on the crop year beginning in August. For natural rubber and tropical timber, time refers to the calendar year.

Sources: International Cotton Advisory Committee, International Study Rubber Group, FAO, and World Bank.



production, which accounts for more than half of total fertilizer use, declined for the sixth consecutive year in 2002, but it is expected to increase in 2003 and 2004 in response to recent and expected grain price increases. Production capacity remains substantially larger than demand for all major fertilizers, but it is most extreme in potash, where surplus capacity may be as high as 30 percent of demand, according to industry estimates.

Nitrogen fertilizer prices (as represented by urea prices) were down about 2 percent in 2002, as exports from major producers in Eastern Europe fell because of rising natural gas prices, currency changes that made exports less profitable, and increased local fertilizer demand. This fall was partially offset by reduced demand in major importing countries as a result of low commodity prices and increased local fertilizer production. Urea prices are expected to continue to increase because of higher grain prices and reduced exports from Eastern Europe. By 2005, nominal urea prices are projected to increase 36 percent from 2002, but then increases are expected to slow, and real prices should decline. By 2015, real urea prices are expected to remain 19 per-

cent above 2002 levels, as the industry continues to rationalize and reduce surplus capacity.

Prices for potassium chloride (also known as muriate of potash, or MOP) declined 5 percent in 2002 from weak demand and large surplus capacity. Price declines could have been much larger without aggressive supply controls by major exporters. Increased domestic production in China is expected to weaken future import demand and, along with a large surplus in global production capacity, to keep price increases small, despite the increased use for grain production, which accompanies the recovery in grain prices. By 2005, nominal MOP prices are projected to increase 10 percent from 2002 levels, and real prices are projected to fall 6 percent by 2015 compared with 2002 prices.

Triple super phosphate (TSP) prices increased 5 percent in 2002 after falling 27 percent from 1998 to 2001. Production fell in 2001 in response to low prices, and imports declined slightly because of increased local production in China and India. Demand should increase along with increased grain prices and area planted. Surplus capacity is smaller than for other major fertilizers and is expected to decline over the next several years. This decline will cause nominal TSP prices to increase by an estimated 13 percent by 2005. Real prices are projected to decline by 5 percent by 2015 from 2002 levels.

The large surplus of global production capacity in the fertilizer industry is largely a result of the sharp declines in consumption in former Soviet bloc and Eastern European countries following the collapse of the former Soviet Union and the transition of those countries to market economies. Many countries (such as Russia and Ukraine) were left with large production capacities and reduced domestic demand—which led to export growth of nearly 4 percent per year since 1993 from the former Soviet Union. Those increased exports displaced traditional exports and depressed prices of nitrogen and phosphate fertilizers. Global fertilizer consumption fell about 17 percent from 1988 to 1993 and has only recently

**Table A2.9 Global balance for fertilizers***(million tons)*

	1970	1980	1990	1998	1999	2000	Annual growth rates (%)		
							1970–80	1980–90	1990–2000
<b>Nitrogen</b>									
Production	33.30	62.78	82.28	88.30	87.75	84.62	6.53	3.12	0.28
Consumption	31.76	60.78	77.18	82.77	84.95	81.62	6.86	2.60	0.56
Exports	6.77	13.15	19.59	23.00	23.94	24.70	7.23	5.10	2.34
<b>Phosphate</b>									
Production	22.04	34.51	39.18	33.09	32.51	31.70	3.72	1.70	-2.10
Consumption	21.12	31.70	35.90	33.35	33.46	32.65	3.85	1.39	-0.90
Exports	2.92	7.51	10.50	12.59	12.70	12.11	8.37	5.01	1.44
<b>Potash</b>									
Production	17.59	27.46	26.82	25.01	25.01	25.54	3.97	-0.03	-0.49
Consumption	16.43	24.24	24.68	22.04	22.12	22.16	3.93	0.05	-1.07
Exports	9.45	16.72	19.82	22.23	22.65	23.41	4.89	0.73	1.68

Note: All data are in marketing years.

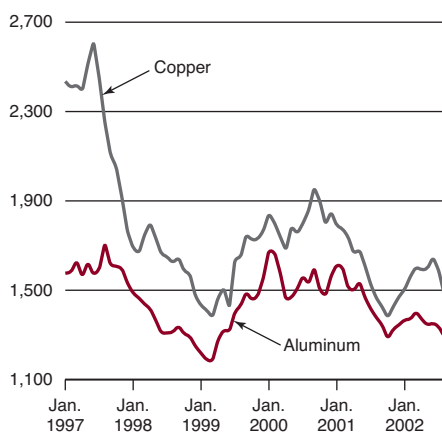
Source: Food and Agriculture Organization.

recovered to near the 1988 peak. Table A2.9 gives the global balances for fertilizers.

## Metals and minerals

Prices for metals and minerals rallied from the October 2001 lows because of expectations of a robust economic recovery that would lead to a strong demand for metals. However, the price rally stalled in the second quarter of 2002, as it appeared the recovery would be more muted than anticipated. With weak demand and large inventories, most metal prices have receded to at or below end-2001 levels (see figure A2.7 for aluminum and copper). Even with the rally, the index of metals and minerals prices during the first nine months of 2002 averaged 5.6 percent lower than for the same period a year earlier.

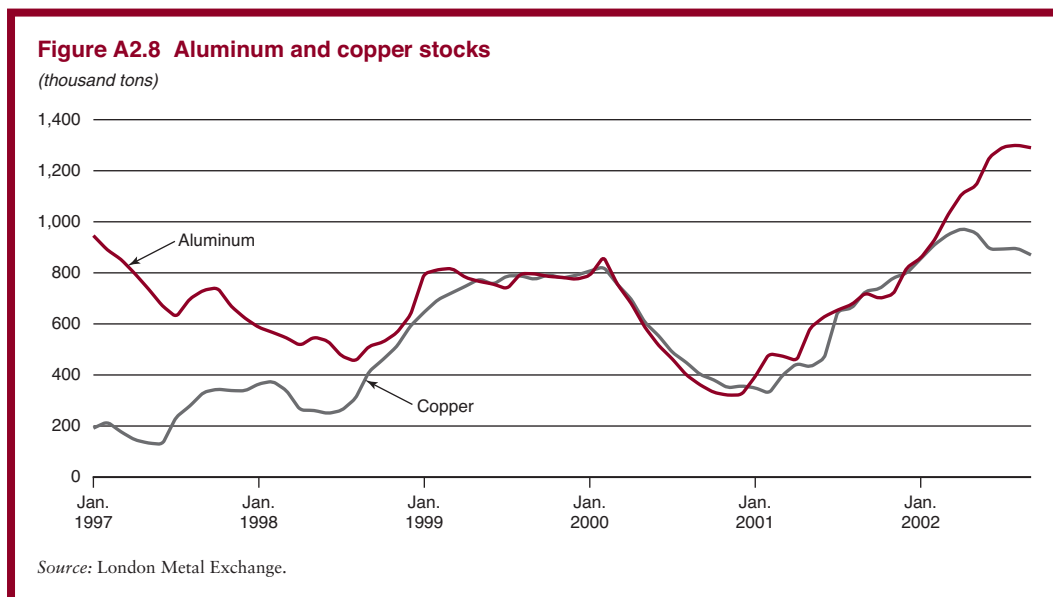
Growth in demand has been very sluggish in 2002, with little indication of strong growth in the near term. Meanwhile, production continues to rise, despite efforts to shut capacity. As a result, the London Metal Exchange (LME) inventories of most metals have continued to rise to relatively high levels (see figure A2.8 for aluminum and copper). A number of production cutbacks, notably in copper and alumi-

**Figure A2.7 Aluminum and copper prices***(dollars per ton)*

Source: Platt's Metals Week.

num, have helped support prices, but more closures may be necessary to prevent further stock building and even lower prices.

The price recovery will likely be delayed until 2003, and the strength of the recovery will largely be determined by the timing and strength of the rebound in the global economy.



There is a possibility that during the upturn of the next economic cycle metal prices could rise significantly, augmented by strong buying from investment funds. However, this rise would induce the development of new capacity and the restart of idle facilities, and prices would eventually decline. Real metals and minerals prices are expected to decline in the long term, as production costs continue to fall with the implementation of new technologies and of improved managerial practices.

### *Aluminum*

Aluminum prices have fallen back near the lows of October 2001 because of relatively weak demand, rising production, and soaring stocks. Prices have been partly supported by reductions in capacity caused by high electricity prices and rationing in the Pacific Northwest and Brazil, but reactivations in Brazil and to a lesser extent in North America have contributed to the surplus. Production in China has grown significantly, and despite demand growth of more than 10 percent per year, the country became a net exporter this year, adding to the downward pressure on prices.

Growth in demand is expected to accelerate in 2003, but the market is expected to remain in

surplus over the next two years, which should prevent any substantial increase in prices. Chinese exports are expected to continue rising over this period, contributing to the surplus. The market is not expected to move into deficit until 2005, but there are many risks in the near term, such as the strength of the economic recovery, the reactivation of idle capacity, and the amount of Chinese net exports.

Real prices for primary aluminum are expected to decline in the long term, as new low-cost capacity is developed to meet expected growth in demand. However, investment in new aluminum plants will continue to require low-cost power supplies. There is not expected to be any significant constraint on alumina supply in the medium term, because several new alumina capacity expansions are under way.

### *Copper*

Copper prices led the rally in base metals during the past year following a series of production cuts, with prices rising 20 percent from October 2001 to June 2002. Prices have since receded because of prospects of weak demand in the near term. However, the market is expected to be in reasonable balance this year as world mine production declines about 2 percent because of



industry curtailments. LME inventories remain high, although they started to decline in May largely as a result of the strong growth of Chinese imports.

Demand is expected to strengthen next year, and supply is expected to almost keep pace, largely because of the recent commissioning of Chile's Escondida Phase IV project and the restart of idle capacity. The firm market balance should help support prices, but high stocks may prevent sharply higher gains next year. The market is expected to remain in modest deficit over the next few years, which should support rising prices during the forthcoming economic cycle. In the longer term, increases in new low-cost capacity are expected to result in the continued decline of real prices. A major uncertainty over the forecast period will be the volume of Chinese imports.

### Nickel

Nickel has been one base metal to sustain price increases this year, with a 38 percent gain between October 2001 and September 2002. Relatively low stocks and Russian Norilsk's efforts to keep surplus supplies off the export market have supported prices that are significantly higher than would be expected at the bottom of the business cycle. Norilsk is using

60,000 tons of stock as collateral against a three-year loan from Western banks, which may keep the material off the market for the duration of the loan. Demand for nickel has been relatively strong in the stainless steel sector, largely because of the shortage of scrap supply.

The nickel market is expected to move into deficit in 2003 and over the next few years because production increases are expected to fall short of a strong growth in demand. No major new projects are being commissioned until 2005. Poor technical and financial performance with pressure-acid-leach technology in Australia has been a major reason for the current lack of investment, which could result in fairly strong prices over the next couple of years. Over the long term, large new developments are expected to come onstream, such as Inco's Goro project in New Caledonia (in 2005) and Voisey Bay in Labrador, Canada (in 2006). Supply will originate from other new projects, expansions, and Norilsk's stockpiled material. New technologies will lead to lower costs, and real prices are expected to decline.

Table A2.10 shows the production, consumption, and LME ending stocks for aluminum, copper, and nickel from 1970 through 2001.

**Table A2.10 Global balance for metals and minerals**

(thousand tons)

	1970	1980	1990	1999	2000	2001	Annual growth rates (%)		
							1970-80	1980-90	1990-2001
<b>Aluminum</b>									
Production	10,257	16,027	19,362	23,710	24,465	24,521	3.2	1.9	2.2
Consumption	9,996	14,771	19,244	23,358	24,871	23,525	3.2	1.8	1.8
LME ending stocks		68	311	775	322	821	n.a.	-0.3	9.2
<b>Copper</b>									
Production	7,583	9,242	10,809	14,463	14,831	15,571	1.9	1.1	3.4
Consumption	7,294	9,400	10,780	14,024	15,104	14,583	2.5	1.0	2.8
LME ending stocks	72	123	179	790	357	799	7.4	-5.6	14.6
<b>Nickel</b>									
Production	0	717	842	1,028	1,102	1,128	n.a.	1.6	2.7
Consumption	0	742	858	1,059	1,146	1,150	n.a.	1.5	2.7
LME ending stocks	2,130	4,554	4,344	47	10	19	n.a.	-0.5	15.2

Sources: World Bureau of Metal Statistics, London Metal Exchange, and World Bank.

## Gold

Gold prices have averaged more than \$300 per troy ounce (toz) since April 2002, which is the first time since 1997 that prices have been above \$300 for more than a month. Much of the strength has been from buybacks of hedged positions by gold producers. In addition, increased investment demand—partly in reaction to declining U.S. equity markets and the declining dollar—has helped support prices.

However, the recent rally in gold prices is not expected to endure as producer buybacks end and central bank selling continues. At present, hedging by producers is unattractive because of low interest rates, but at some point producer hedging could again become attractive, which would push prices lower. Although the United Kingdom's central bank sales program ended in March 2002, other central banks (such as Switzerland's) are proceeding with their programs.

If prices remain above \$300/toz, they will weaken the price-sensitive jewelry demand market and will stimulate investment in new supply. Even when prices fall below \$300 per toz, mine production is expected to continue to increase moderately as new low-cost opera-

tions come onstream. An important determinant of medium-term prices will be the decision by central banks on whether official gold sales should be stemmed further when the Washington Agreement expires in 2004.<sup>3</sup>

Table A2.11 shows the demand for end supply of gold from 1991 through 2001.

## Petroleum

Oil prices slumped after September 11, 2001, because the economic recession, mild weather, and reduced air travel weakened demand. Also, OPEC made no attempts to prop up falling prices (figure A2.9). However, as OPEC prices fell well below the organization's target range of \$22 to \$28 per barrel (OPEC basket \$17.53 per barrel in December 2001), 10 OPEC countries, excluding Iraq, agreed to reduce production quotas 6.5 percent at the start of 2002. This reduction was the fourth cut in quotas in less than a year, totaling 5 million barrels per day or 19 percent (figure A2.10).

Prices started to rebound at the end of 2001 on expectations that markets would tighten because of a recovery in world oil demand, OPEC

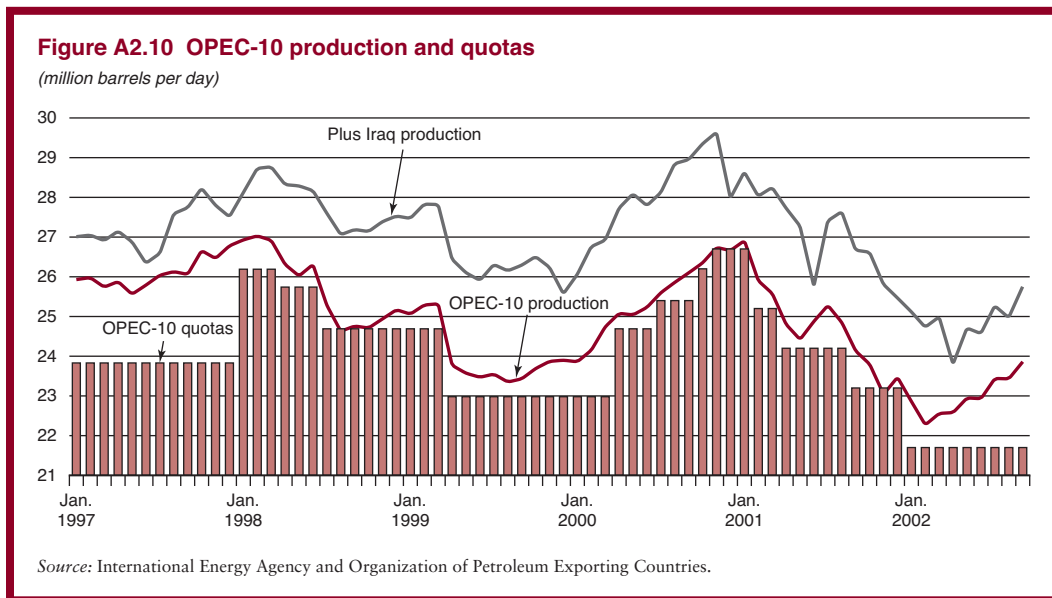
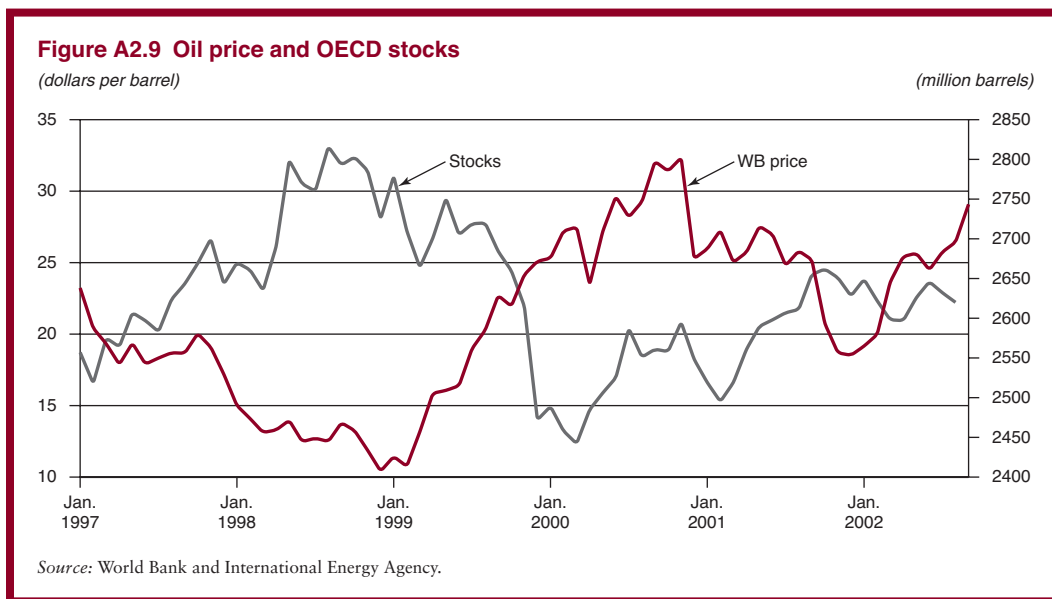
**Table A2.11 Global balance for gold**

(tons)

	1991	1995	1996	1997	1998	1999	2000	2001	Percent per year
									1991–2001
<b>Demand</b>									
Jewelry	2,358	2,618	2,791	2,851	3,349	3,149	3,188	2,995	2.4
Other fabrication	518	457	503	484	560	595	564	487	-0.6
Bar hoarding	252	231	306	182	325	240	214	220	-1.3
Other	2,358	n.a.	6	n.a.	n.a.	170	n.a.	n.a.	n.a.
Total demand	3,128	3,305	3,606	3,518	4,234	4,154	3,982	3,804	2.0
<b>Supply</b>									
Mine production	2,159	2,279	2,274	2,361	2,479	2,568	2,580	2,595	1.9
Net official sales	111	81	173	279	626	464	471	468	15.5
Old gold scrap	482	617	625	640	628	616	608	695	3.7
Net hedging	66	163	535	142	504	506	n.a.	n.a.	n.a.
Other	310	173	n.a.	95	297	n.a.	322	46	n.a.
Total supply	3,128	3,305	3,606	3,946	4,154	4,154	3,982	3,804	2.0

n.a. = Not available.

Sources: Gold Field Minerals Service and World Bank.



output restraint, and declining stocks. In addition, perceived threats of a supply disruption from a United States–led invasion of Iraq also helped push prices higher, and those anxieties deepened as the year progressed. The World Bank’s average price rose above \$20 per barrel

in March and approached \$30 per barrel in September as U.S. President George W. Bush took his case for war against Iraq to the United Nations (U.N.). Market fundamentals also started to tighten heading into the peak-demand winter season.

**Table A2.12 Global balance for petroleum***(million barrels per day)*

	1970	1980	1990	2001	2002	2003	Annual growth rates (%)		
							1970–80	1980–90	1990–2001
<b>Consumption</b>									
OECD	34.0	41.5	41.5	47.7	47.6	48.0	2.0	0.0	1.3
Former Soviet Union	5.0	8.9	8.4	3.7	3.8	3.9	6.0	-0.6	-7.2
Other non-OECD countries	6.8	12.3	16.1	25.1	25.3	25.7	6.1	2.7	4.1
Total	45.7	62.6	66.0	76.5	76.6	77.5	3.2	0.5	1.3
<b>Production</b>									
OPEC	23.5	27.2	24.5	30.2	28.5	28.7	1.5	-1.0	1.9
Former Soviet Union	7.1	12.1	11.5	8.6	9.3	9.9	5.4	-0.5	-2.6
Other non-OPEC countries	17.4	24.6	30.9	38.2	38.6	39.1	3.5	2.3	1.9
Total	48.0	63.9	66.9	76.9	76.4	77.7	2.9	0.5	1.3
Stock change, miscellaneous	2.3	1.3	0.9	0.4	-0.2	0.3			
Memo item: Iraq	1.6	2.7	2.0	2.4	1.9	2.0	5.5	-2.7	1.5

Sources: BP, International Energy Agency, and World Bank.

Fundamentally, the market was in reasonable balance for much of 2002, and inventories were at fairly typical levels, although stocks could fall to relatively low levels during the winter without higher OPEC production. World oil demand is likely to rise only marginally this year (table A2.12), similar to the gain in 2001. Meanwhile non-OPEC supplies continue to increase strongly, rising by an estimated 1.2 million barrels per day, with more than half of the gain expected to come from Russia.

It is only through significant production restraint that OPEC has kept prices within its target range—notwithstanding some overproduction by members of the group. In addition, Iraq's exports have been less than half of the country's potential for much of the year, because of disputes with the U.N. about Iraq's surcharges, which the U.N. sought to eliminate with a retroactive pricing scheme. However, buyers are exposed to large risks with this mechanism, and crude oil purchases from Iraq were curtailed.

Expectations of an attack on Iraq have led to a wide range of estimates of a "war premium" on prices this year. Estimates range from very little (prices reflect the market balance) to several dollars per barrel. It is very

difficult to quantify such a premium, and no precise definition exists. Energy expert Philip K. Verleger Jr. defines the premium as the incremental amount a buyer is willing to pay for ensured prompt supply over deferred oil given the level of inventories. He argues according to that definition that no war premium existed at the end of September 2002.<sup>4</sup>

The near-term outlook for the oil market depends heavily on developments in Iraq and on OPEC's production decisions. While there is agreement between the United States and U.N. to allow weapons inspectors back into Iraq, there is likely to be less agreement on how to proceed if Iraq refuses U.N. demands. Should an attack occur in the coming months, prices could spike sharply higher, depending on the prevailing level of inventories, the response from OPEC producers, and the drawdown of strategic reserves. During the 1990 war in the Persian Gulf, more than 4 mb/d of oil from Kuwait and Iraq were removed from international markets, and prices exceeded \$40/bbl. There was substantial surplus production within OPEC, and the organization raised output—but not immediately. Importantly, prices did not fall until the war commenced (and its success was quickly assured) and the strategic stocks were released.

Since Iraq is exporting only around 1 mb/d, much less oil is at risk, although it is conceivable that Iraq could launch scud missiles into Kuwait and Saudi Arabia and could temporarily disrupt supplies. There is more surplus capacity within OPEC than in 1990, and sufficient spare capacity within Saudi Arabia alone could easily replace lost oil from Iraq. However, OPEC desires prices of at least \$25/bbl, and it is not clear how quickly its members will raise production to prevent a surge in prices. In such an environment, crude prices could be bid up sharply because of higher demand, speculation, and hoarding. Buyers might have to pay a substantial premium for prompt supplies, and prices could rise to 1990 levels.

Once war ends, prices could fall precipitously as a result of a higher OPEC production, a draw from strategic stocks, and the return of Iraqi exports. Disputes within OPEC over market share could take prices well below \$20/bbl.

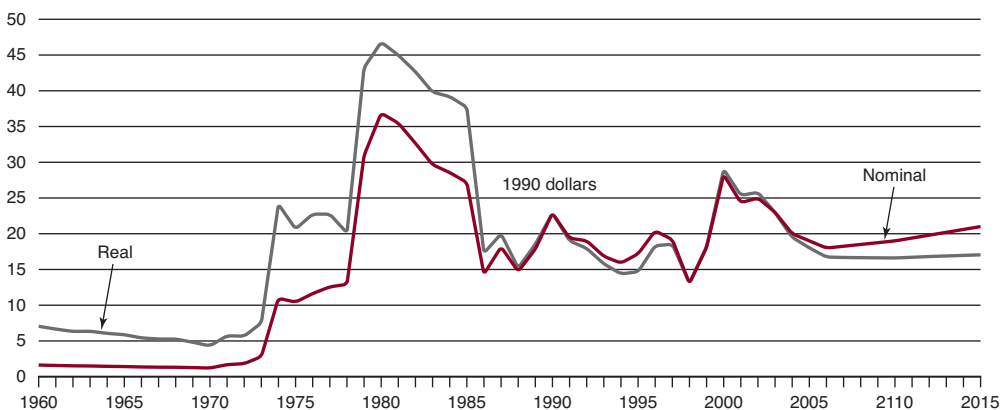
In the absence of an attack, OPEC's production decisions will heavily influence prices. The group will likely attempt to keep prices at \$25/bbl. Higher OPEC production will be required during the winter to keep prices

below \$30/bbl, but the organization may have to reduce output at winter's end to keep prices within its price target. The demand for OPEC oil is expected to rise only modestly in 2003. An increase in non-OPEC supply of 1 mb/d is expected to capture the bulk of the growth in world oil demand. Rising capacity within OPEC, requests for higher quotas (from Algeria and Nigeria), and a recovery of Iraq's exports could strain OPEC's efforts to support higher prices. But as long as the risk of a supply disruption hangs over the market, prices are likely to remain well within OPEC's target range.

Oil prices are expected to decline from \$25 per barrel in 2002 to \$23 per barrel in 2003 as a result of rising supply competition and below-trend growth in demand. By mid-decade, prices are expected to fall below \$20 per barrel (figure A2.11). A risk to the forecast is that OPEC could maintain strong production discipline over the next few years to keep prices at or above \$25 per barrel. If such efforts prove successful, they would add to the growing pressures on prices—by negatively affecting demand and by stimulating competing supplies—and prices would still be expected to fall below \$20 per barrel by

**Figure A2.11 Crude oil prices**

(dollars per barrel)



Source: World Bank.

mid-decade. By 2005–06, significant new supplies from West Africa, the Caspian Sea, and elsewhere are expected to become available. Coupled with rising capacity within OPEC, those supplies will exert severe downward pressure on prices.

In the long term, growth in demand will be only moderate, as it has been for the past 20 years (table A2.12), but new technologies, environmental pressures, and government policies could further reduce this growth. Prices somewhat below \$20 per barrel are sufficiently high to generate ample development of conventional and unconventional oil supplies, and there are no apparent resource constraints far into the future. In addition, new areas continue to be developed (for example,

deep water offshore and the Caspian Sea), and development costs continue to fall from new technologies (shifting supply curves outward). In addition, OPEC members are increasing capacity and will add to the supply competition in the coming years. Consequently, real oil prices are expected to continue their long-term decline.

As mentioned at the beginning of this appendix, we will now present tables showing actual commodity prices for 1970 through 2001, plus price projections for 2002 through 2015. Table A2.13 gives the commodity prices and forecasts in current dollars, table A2.14 uses constant 1990 dollars, and table A2.15 displays weighted indices of commodity prices and inflation.



**Table A2.13 Commodity prices and price projections in current dollars**

Commodity	Unit <sup>a</sup>	Actual					Projections				
		1970	1980	1990	2000	2001	2002	2003	2005	2010	2015
<b>Energy</b>											
Coal, Australia	\$/mt	n.a.	n.a.	39.67	26.25	32.31	26.50	26.00	27.00	29.50	32.00
Crude oil, average	\$/bbl	1.21	36.87	22.88	28.23	24.35	25.00	23.00	19.00	19.00	21.00
Natural gas, Europe	\$/mmbtu	n.a.	3.40	2.55	3.86	4.06	3.00	2.80	2.60	2.75	3.00
Natural gas, U.S.	\$/mmbtu	0.17	1.55	1.70	4.31	3.96	3.25	3.20	3.00	3.00	3.25
<b>Nonenergy commodities</b>											
<b>Agriculture</b>											
<b>Beverages</b>											
Cocoa	c/kg	67.5	260.4	126.7	90.6	106.9	182.0	182.0	160.0	157.0	168.0
Coffee, other milds	c/kg	114.7	346.6	197.2	192.0	137.3	133.0	141.1	187.4	242.5	280.0
Coffee, robusta	c/kg	91.4	324.3	118.2	91.3	60.7	63.9	70.6	83.8	110.0	142.6
Tea, auctions (3) average	c/kg	83.5	165.9	205.8	187.6	159.8	150.0	155.0	165.0	175.0	180.0
<b>Food</b>											
<b>Fats and oils</b>											
Coconut oil	\$/mt	397.2	673.8	336.5	450.3	318.1	415.0	450.0	600.0	645.0	670.0
Copra	\$/mt	224.8	452.7	230.7	304.8	202.1	268.0	375.0	450.0	480.0	500.0
Groundnut oil	\$/mt	378.6	858.8	963.7	713.7	680.3	680.0	750.0	820.0	850.0	875.0
Palm oil	\$/mt	260.1	583.7	289.8	310.3	285.7	385.0	390.0	400.0	450.0	475.0
Soybean meal	\$/mt	102.6	262.4	200.2	189.2	181.0	175.0	200.0	205.0	215.0	220.0
Soybean oil	\$/mt	286.3	597.6	447.3	338.1	354.0	440.0	450.0	430.0	460.0	505.0
Soybeans	\$/mt	116.9	296.2	246.8	211.8	195.8	210.0	230.0	235.0	240.0	250.0
<b>Grains</b>											
Maize	\$/mt	58.4	125.3	109.3	88.5	89.6	100.0	125.0	115.0	120.0	130.0
Rice, Thailand, 5%	\$/mt	126.3	410.7	270.9	202.4	172.8	192.0	210.0	235.0	260.0	265.0
Sorghum	\$/mt	51.8	128.9	103.9	88.0	95.2	102.0	125.0	116.6	119.5	128.0
Wheat, U.S., HRW	\$/mt	54.9	172.7	135.5	114.1	126.8	151.5	180.0	150.0	160.0	165.0
<b>Other food</b>											
Bananas, U.S.	\$/mt	166.1	377.3	540.9	424.0	583.3	530.0	518.1	529.1	568.0	590.0
Beef, U.S.	c/kg	130.4	276.0	256.3	193.2	212.9	215.0	230.0	228.0	222.0	230.0
Oranges	\$/mt	168.0	400.2	531.1	363.2	595.5	588.0	550.0	500.0	525.0	550.0
Shrimp, Mexico	c/kg	n.a.	1,152	1,069	1,513	1,517	1,040	1,150	1,650	1,700	1,720
Sugar, world	c/kg	8.2	63.16	27.67	18.04	19.04	15.00	15.00	17.60	21.00	22.00
<b>Agricultural raw materials</b>											
<b>Timber</b>											
Logs, Cameroon	\$/cum	43.0	251.7	343.5	275.4	266.1	265.0	275.0	300.0	338.0	385.0
Logs, Malaysia	\$/cum	43.1	195.5	177.2	190.0	159.1	163.0	170.0	215.0	260.0	295.0
Sawnwood, Malaysia	\$/cum	175.0	396.0	533.0	594.7	481.4	528.0	560.0	625.0	720.0	820.0
<b>Other raw materials</b>											
Cotton	c/kg	67.6	206.2	181.9	130.2	105.8	100.0	110.2	127.9	149.9	160.0
Rubber, RSS1, Malaysia	c/kg	40.7	142.5	86.5	69.1	60.0	79.4	81.6	83.8	87.7	95.1
Tobacco	\$/mt	1,076	2,276	3,392	2,976	3,005	2,770	3,000	3,250	3,275	3,300
<b>Fertilizers</b>											
DAP	\$/mt	54.0	222.2	171.4	154.2	147.7	158.0	168.0	170.0	175.0	180.0
Phosphate rock	\$/mt	11.00	46.71	40.50	43.75	41.77	40.80	41.00	43.00	45.00	46.00
Potassium chloride	\$/mt	32.0	115.7	98.1	122.5	118.1	113.0	120.0	124.0	127.0	130.0
TSP	\$/mt	43.0	180.3	131.8	137.7	126.9	133.0	140.0	150.0	150.0	155.0
Urea, East Europe, bagged	\$/mt	n.a.	n.a.	119.3	101.1	95.3	93.0	108.6	126.7	131.3	135.8
<b>Metals and minerals</b>											
Aluminum	\$/mt	556	1,456	1,639	1,549	1,444	1,340	1,400	1,500	1,600	1,700
Copper	\$/mt	1,416	2,182	2,661	1,813	1,578	1,545	1,650	1,900	2,000	2,050
Gold	\$/toz	35.9	607.9	383.5	279.0	271.0	310.0	300.0	275.0	300.0	300.0
Iron ore	c/dmtu	9.84	28.09	32.50	28.79	30.03	29.50	30.00	31.00	32.00	32.50
Lad	c/kg	30.3	90.6	81.1	45.4	47.6	45.0	48.0	55.0	60.0	62.5
Nickel	\$/mt	2,846	6,519	8,864	8,638	5,945	6,700	7,500	7,500	6,700	6,800
Silver	c/toz	177.0	2,064	482.0	499.9	438.6	460.0	480.0	500.0	525.0	550.0
Tin	c/kg	367.3	1,677	608.5	543.6	448.4	405.0	450.0	525.0	540.0	550.0
Zinc	c/kg	29.6	76.1	151.4	112.8	88.6	77.0	84.0	100.0	105.0	110.0

n.a. = Not available.

a. \$ = U.S. dollar, c = U.S. cent, bbl = barrel, cum = cubic meter, dmtu = dry metric ton unit, kg = kilogram, mmbtu = million British thermal unit, mt = metric ton, and toz = troy ounce.

Note: Projections as of November 12, 2002.

Source: World Bank, Development Prospects Group.

**Table A2.14 Commodity prices and price projections in constant 1990 dollars**

Commodity	Unit <sup>a</sup>	Actual					Projections				
		1970	1980	1990	2000	2001	2002	2003	2005	2010	2015
<b>Energy</b>											
Coal, Australia	\$/mt	n.a.	n.a.	39.67	26.97	33.68	27.48	26.18	26.06	26.53	27.00
Crude oil, average	\$/bbl	4.31	46.80	22.88	29.01	25.38	25.92	23.16	18.34	17.09	17.72
Natural gas, Europe	\$/mmbtu	n.a.	4.32	2.55	3.96	4.23	3.11	2.82	2.51	2.47	2.53
Natural gas, U.S.	\$/mmbtu	0.61	1.97	1.70	4.43	4.12	3.37	3.22	2.90	2.70	2.74
<b>Nonenergy Commodities</b>											
<b>Agriculture</b>											
<b>Beverages</b>											
Cocoa	c/kg	240.6	330.5	126.7	93.1	111.4	188.7	183.2	154.5	141.2	141.8
Coffee, other milds	c/kg	408.8	440.0	197.2	197.3	143.1	137.9	142.1	180.9	218.1	236.3
Coffee, robusta	c/kg	325.7	411.7	118.2	93.8	63.3	66.3	71.0	80.9	98.9	120.3
Tea, auctions (3) average	c/kg	297.7	210.6	205.8	192.8	166.6	155.5	156.1	159.3	157.4	151.9
<b>Food</b>											
<b>Fats and oils</b>											
Coconut oil	\$/mt	1,416.0	855.3	336.5	462.7	331.5	430.3	453.0	579.2	580.1	565.4
Copra	\$/mt	801.6	574.7	230.7	313.1	210.6	277.9	377.5	434.4	431.7	421.9
Groundnut oil	\$/mt	1,349.5	1,090.1	963.7	733.3	709.0	705.0	755.1	791.6	764.5	738.3
Palm oil	\$/mt	927.1	740.9	289.8	318.8	297.7	399.2	392.6	386.1	404.8	400.8
Soybean meal	\$/mt	365.7	333.1	200.2	194.4	188.6	181.4	201.4	197.9	193.4	185.6
Soybean oil	\$/mt	1,020.8	758.6	447.3	347.4	368.9	456.2	453.0	415.1	413.7	426.1
Soybeans	\$/mt	416.8	376.0	246.8	217.7	204.1	217.7	231.6	226.9	215.9	211.0
<b>Grains</b>											
Maize	\$/mt	208.2	159.0	109.3	91.0	93.4	103.7	125.8	111.0	107.9	109.7
Rice, Thailand, 5%	\$/mt	450.3	521.4	270.9	208.0	180.1	199.1	211.4	226.9	233.9	223.6
Sorghum	\$/mt	184.7	163.6	103.9	90.4	99.3	105.8	125.8	112.6	107.5	108.0
Wheat, U.S., HRW	\$/mt	195.7	219.3	135.5	117.2	132.2	157.1	181.2	144.8	143.9	139.2
<b>Other food</b>											
Bananas, U.S.	\$/mt	592.1	478.9	540.9	435.7	607.9	549.5	521.6	510.8	510.9	497.9
Beef, U.S.	c/kg	465.0	350.3	256.3	198.5	221.9	222.9	231.6	220.1	199.7	194.1
Oranges	\$/mt	599.1	508.0	531.1	373.2	620.6	609.6	553.7	482.7	472.2	464.1
Shrimp, Mexico	c/kg	n.a.	1,462	1,069	1,554	1,581	1,078	1,158	1,593	1,529	1,451
Sugar, world	c/kg	29.32	80.17	27.67	18.5	19.8	15.6	15.1	17.0	18.9	18.6
<b>Agricultural raw materials</b>											
<b>Timber</b>											
Logs, Cameroon	\$/cum	153.3	319.5	343.5	283.0	277.3	274.8	276.9	289.6	304.0	324.9
Logs, Malaysia	\$/cum	153.8	248.2	177.2	195.2	165.8	169.0	171.2	207.6	233.9	248.9
Sawnwood, Malaysia	\$/cum	623.9	502.7	533.0	611.1	501.7	547.4	563.8	603.3	647.6	691.9
<b>Other raw materials</b>											
Cotton	c/kg	241.1	261.7	181.9	133.8	110.3	103.7	111.0	123.4	134.8	135.0
Rubber, RSS1, Malaysia	c/kg	145.2	180.8	86.5	71.0	62.6	82.3	82.1	80.9	78.9	80.2
Tobacco	\$/mt	3,836	2,889	3,392	3,058	3,131	2,872	3,020	3,137	2,946	2,785
<b>Fertilizers</b>											
DAP	\$/mt	192.5	282.1	171.4	158.5	154.0	163.8	169.1	164.1	157.4	151.9
Phosphate rock	\$/mt	39.2	59.3	40.5	45.0	43.5	42.3	41.3	41.5	40.5	38.8
Potassium chloride	\$/mt	114.1	146.9	98.1	125.9	123.1	117.2	120.8	119.7	114.2	109.7
TSP	\$/mt	153.3	228.8	131.8	141.5	132.2	137.9	140.9	144.8	134.9	130.8
Urea, East Europe, bulk	\$/mt	n.a.	n.a.	119.3	103.9	99.3	96.4	109.4	122.3	118.1	114.6
<b>Metals and minerals</b>											
Aluminum	\$/mt	1,982	1,848	1,639	1,592	1,505	1,389	1,409	1,448	1,439	1,434
Copper	\$/mt	5,047	2,770	2,661	1,863	1,645	1,602	1,661	1,834	1,799	1,730
Gold	\$/toz	128.1	771.6	383.5	286.7	282.4	321.4	302.0	265.5	269.8	253.1
Iron ore	c/dmtu	35.1	35.7	32.5	29.6	31.3	30.6	30.2	29.9	28.8	27.4
Lead	c/kg	108.0	115.0	81.1	46.6	49.6	46.7	48.3	53.1	54.0	52.7
Nickel	\$/mt	10,147	8,275	8,864	8,876	6,196	6,947	7,551	7,240	6,026	5,738
Silver	c/toz	631.0	2,619.4	482.0	513.7	457.1	476.9	483.2	482.7	472.2	464.1
Tin	c/kg	1,309.6	2,129.3	608.5	558.5	467.4	419.9	453.0	506.8	485.7	464.1
Zinc	c/kg	105.5	96.6	151.4	115.9	92.3	79.8	84.6	96.5	94.4	92.8

n.a. = Not available.

a. \$ = U.S. dollar, c = U.S. cent, bbl = barrel, cum = cubic meter, dmtu = dry metric ton unit, kg = kilogram, mmbtu = million British thermal unit, mt = metric ton, and toz = troy ounce.

Note: Projections as of November 12, 2002.

Source: World Bank, Development Prospects Group.

**Table A2.15 Weighted indices of commodity prices and inflation (1990 = 100)**

Index	Actual					Projections <sup>a</sup>				
	1970	1980	1990	2000	2001	2002	2003	2005	2010	2015
<b>Current dollars</b>										
Petroleum	5.3	161.2	100.0	123.4	106.4	109.3	100.5	83.0	83.0	91.8
Nonenergy commodities <sup>b</sup>	43.8	125.5	100.0	86.9	79.0	82.9	87.7	94.2	102.7	109.9
Agriculture	45.8	138.1	100.0	87.7	79.7	86.5	91.7	98.0	108.9	118.0
Beverages	56.9	181.4	100.0	88.4	72.1	84.4	87.5	97.8	115.1	130.6
Food	46.7	139.3	100.0	84.5	86.0	89.8	96.3	97.8	104.3	108.2
Fats and oils	64.4	148.7	100.0	96.2	89.0	100.2	108.2	113.1	120.9	126.1
Grains	46.7	134.3	100.0	79.5	78.2	89.0	104.5	99.4	106.6	111.1
Other food	32.2	134.3	100.0	77.7	87.9	81.9	81.9	84.4	89.4	92.0
Raw materials	36.4	104.6	100.0	91.4	77.4	83.6	88.8	98.4	110.2	121.2
Timber	31.8	79.0	100.0	111.0	90.2	98.1	103.9	117.8	136.6	155.5
Other raw materials	39.6	122.0	100.0	78.0	68.6	73.7	78.5	85.2	92.2	97.8
Fertilizers	30.4	128.9	100.0	105.8	98.8	102.0	104.4	111.0	112.8	116.1
Metals and minerals	40.4	94.2	100.0	83.0	75.1	72.4	76.5	83.2	86.4	89.5
<b>Constant 1990 dollars<sup>c</sup></b>										
Petroleum	18.9	204.6	100.0	126.8	110.9	113.3	101.2	80.2	74.7	77.5
Nonenergy commodities	156.3	159.3	100.0	89.3	82.3	86.0	88.3	90.9	92.4	92.7
Agriculture	163.3	175.3	100.0	90.1	83.1	89.6	92.3	94.6	97.9	99.5
Beverages	202.8	230.3	100.0	90.8	75.1	87.5	88.1	94.4	103.5	110.2
Food	166.5	176.8	100.0	86.8	89.6	93.1	96.9	94.5	93.8	91.3
Fats and oils	229.5	188.7	100.0	98.9	92.8	103.8	109.0	109.2	108.8	106.4
Grains	166.6	170.5	100.0	81.7	81.5	92.3	105.2	96.0	95.9	93.8
Other food	114.9	170.5	100.0	79.9	91.6	84.9	82.4	81.5	80.4	77.6
Raw materials	129.8	132.7	100.0	93.9	80.6	86.7	89.4	95.0	99.1	102.3
Timber	113.3	100.3	100.0	114.1	94.0	101.7	104.6	113.7	122.9	131.2
Other raw materials	141.1	154.9	100.0	80.1	71.5	76.5	79.0	82.2	82.9	82.5
Fertilizers	108.3	163.6	100.0	108.7	102.9	105.7	105.1	107.2	101.5	98.0
Metals and minerals	143.9	119.6	100.0	85.3	78.3	75.1	77.0	80.3	77.7	75.5
<b>Inflation indices<sup>d</sup></b>										
MUV index <sup>e</sup>	28.05	78.78	100.00	97.32	95.95	96.45	99.33	103.59	111.18	118.51
Percentage change per annum		10.88	2.41	-0.27	-1.40	0.53	2.98	2.12	1.42	1.29
US GDP deflator	33.59	65.93	100.00	123.73	126.42	127.69	129.73	136.03	153.01	172.27
Percentage change per annum		6.98	4.25	2.15	2.18	1.00	1.60	2.40	2.38	2.40

a. Commodity price projections as of November 12, 2002.

b. The World Bank primary commodity price indices are computed from 1987–89 export values in U.S. dollars for low- and middle-income economies, rebased to 1990. Weights for the subgroup indices expressed as ratios to the nonenergy index are as follows: agriculture—69.1 percent, fertilizers—2.7 percent, and metals and minerals—28.2 percent; beverages—16.9 percent, food—29.4 percent, and raw materials—22.8 percent; fats and oils—10.1 percent, grains—6.9 percent, and other food—12.4 percent; timber—9.3 percent and other raw materials—13.6 percent.

c. Computed from unrounded data and deflated by the manufactures unit value (MUV) index.

d. Inflation indices for 2002–15 are projections as of November 8, 2002. MUV for 2001 is an estimate. Growth rates for 1980, 1990, 2000, 2005, 2010, and 2015 refer to compound annual rate of change between adjacent endpoint years; all others are annual growth rates from the previous year.

e. Unit value index in U.S. dollar terms of manufactures exported from the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States) weighted proportionally to the countries' exports to developing countries.

Source: World Bank, Development Prospects Group. U.S. Department of Commerce for historical U.S. GDP deflator.

## Notes

1. As measured relative to the manufactures unit value (MUV) index, which is the unit value index in U.S. dollar terms (1990 = 100) of manufactures exported from the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States) weighted by the country's exports to developing countries.

2. An El Niño occurs when the Pacific Ocean warms, as occurred this year. But this year's El Niño is significantly weaker than the last one, which occurred in 1997. The Pacific is about 1 degree Centigrade warmer than usual this year compared with 3 degrees

Centigrade warmer in 1997. Thus the effects of this year's El Niño are expected to be smaller than in 1997, when drought in Southeast Asia led to wildfires and poor crop harvests.

3. The European Central Bank and 14 European central banks agreed in September 1999 to limit sales to only 400 tons of gold per year, and not more than 2,000 tons in total, over the subsequent five years.

4. Verleger, Philip K. Jr. *The Petroleum Economics Monthly*. August 2002, p. 11, and September 2002, p. 1.